Plant Protein Innovation Center

COLLABORATIVELY GROWING THE LANDSCAPE OF PLANT-BASED PROTEINS

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https://ppic.cfans.umn.edu

Plant Protein Innovation Center

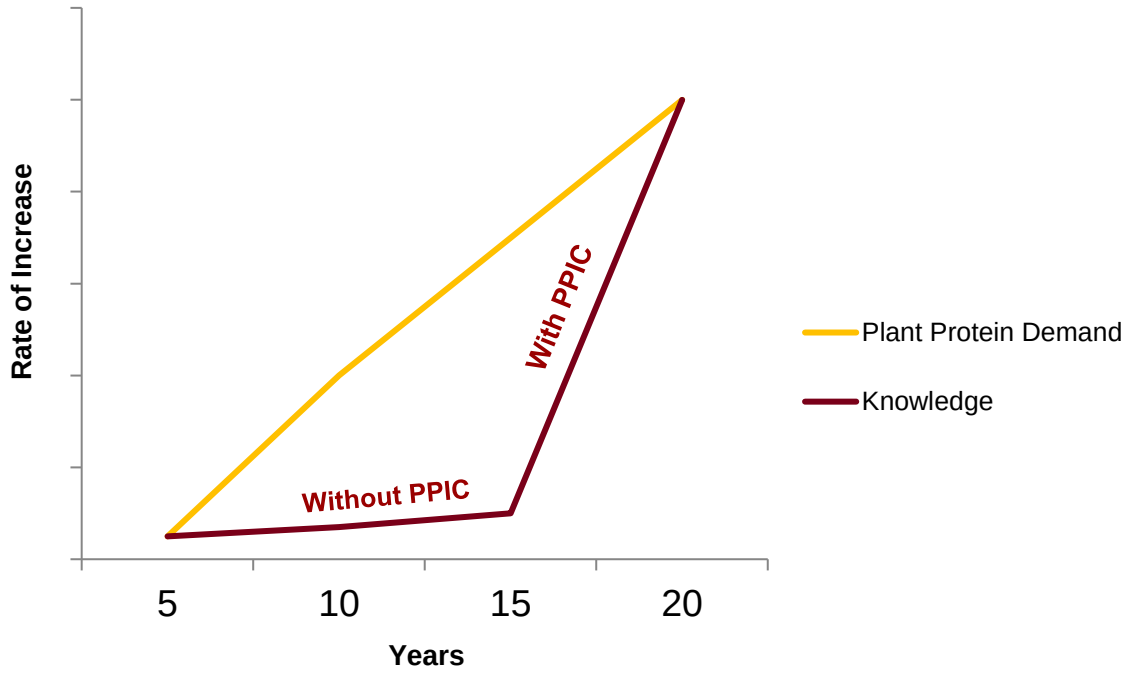
Mission

- The Plant Protein Innovation Center (PPIC)**, first in the nation,** mission is to bring together interdisciplinary researchers and industry partners to deliver to the supply chain new nutritious and functional plant protein ingredients and products, working all the way from breeding and genetics to processing, formulation, and marketing

Approach

- The PPIC will address industry-identified plant-protein challenges and opportunities to develop a wealth of fundamental science leading to a low emission food industry

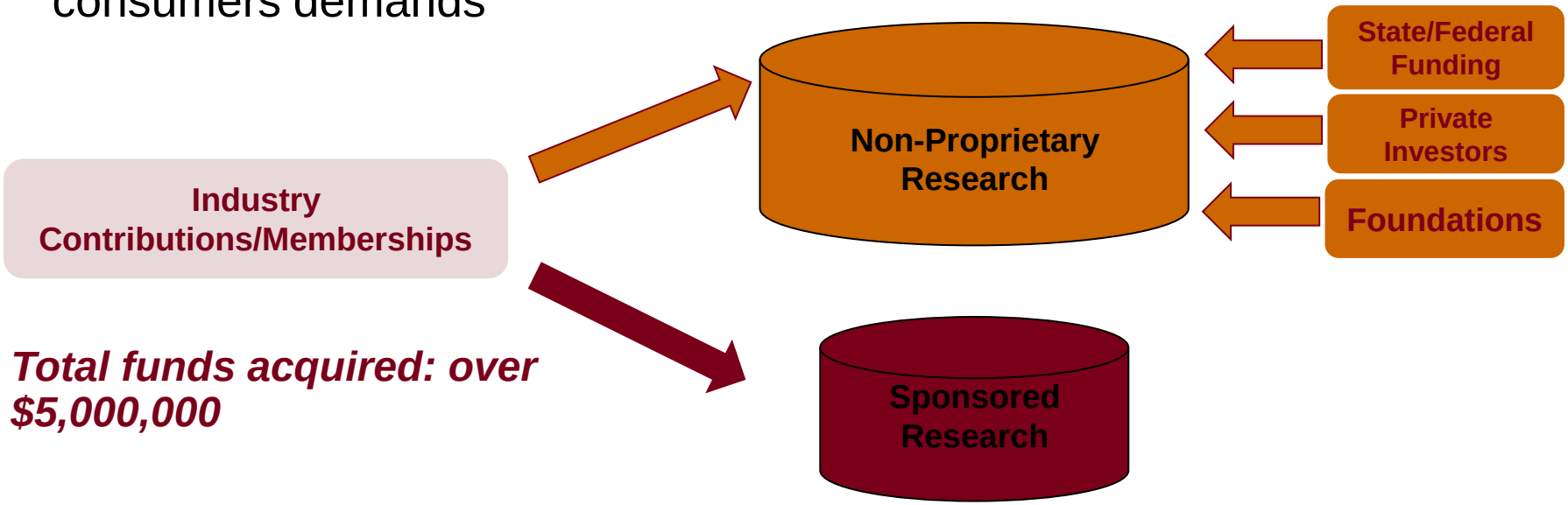
Why PPIC? Why Now?



The PPIC will not only bring economic gain to the industry, but will also address the consumer desire for nutritious and healthy food, have a positive impact on the environment by seeking and utilizing sustainable crops, provide additional sources of protein for the growing population, and provide revenue to farmers

How? The PPIC Model

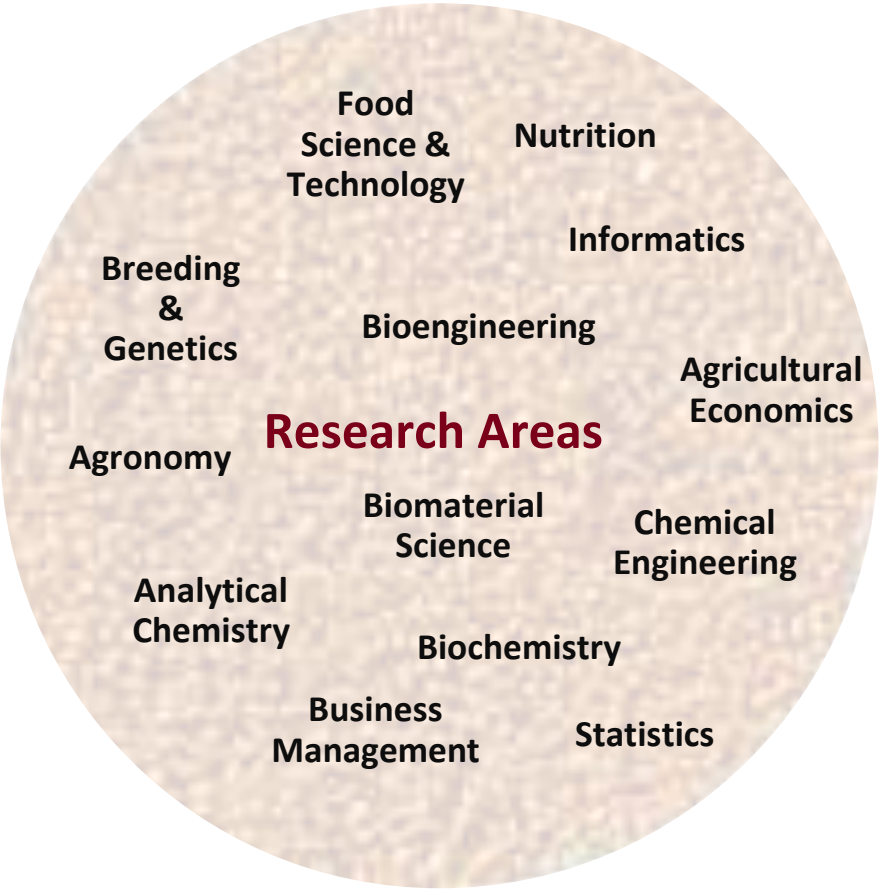
- Research will be mainly **Pre-Competitive** and **Non-Proprietary**
- Will focus on fundamental science that addresses industry needs and consumers demands

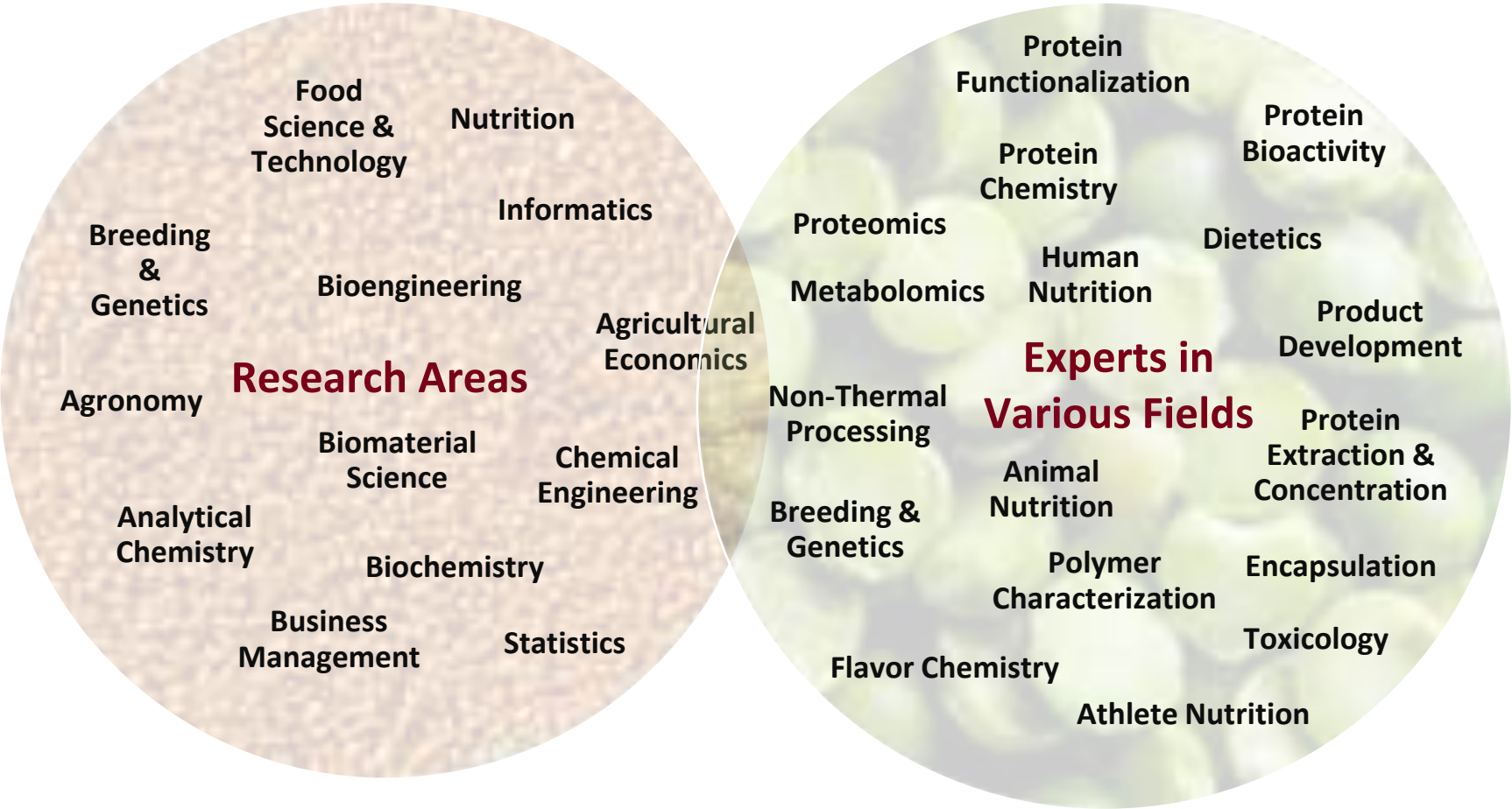


- ***Total funds acquired: over $5,000,000***

The PPIC Model:

Coming Together to Grow Research


Food Science & Technology
Nutrition
Informatics
Breeding & Genetics
Bioengineering
Agricultural Economics
Research Areas
Agronomy
Biomaterial Science
Chemical Engineering
Analytical Chemistry
Biochemistry
Business Management
Statistics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Experts in Various Fields
Protein Functionalization
Protein Bioactivity
Protein Chemistry
Proteomics
Dietetics
Human Nutrition
Metabolomics
Product Development
Non-Thermal Processing
Protein Extraction & Concentration
Animal Nutrition
Breeding & Genetics
Polymer Characterization
Encapsulation
Toxicology
Flavor Chemistry
Athlete Nutrition


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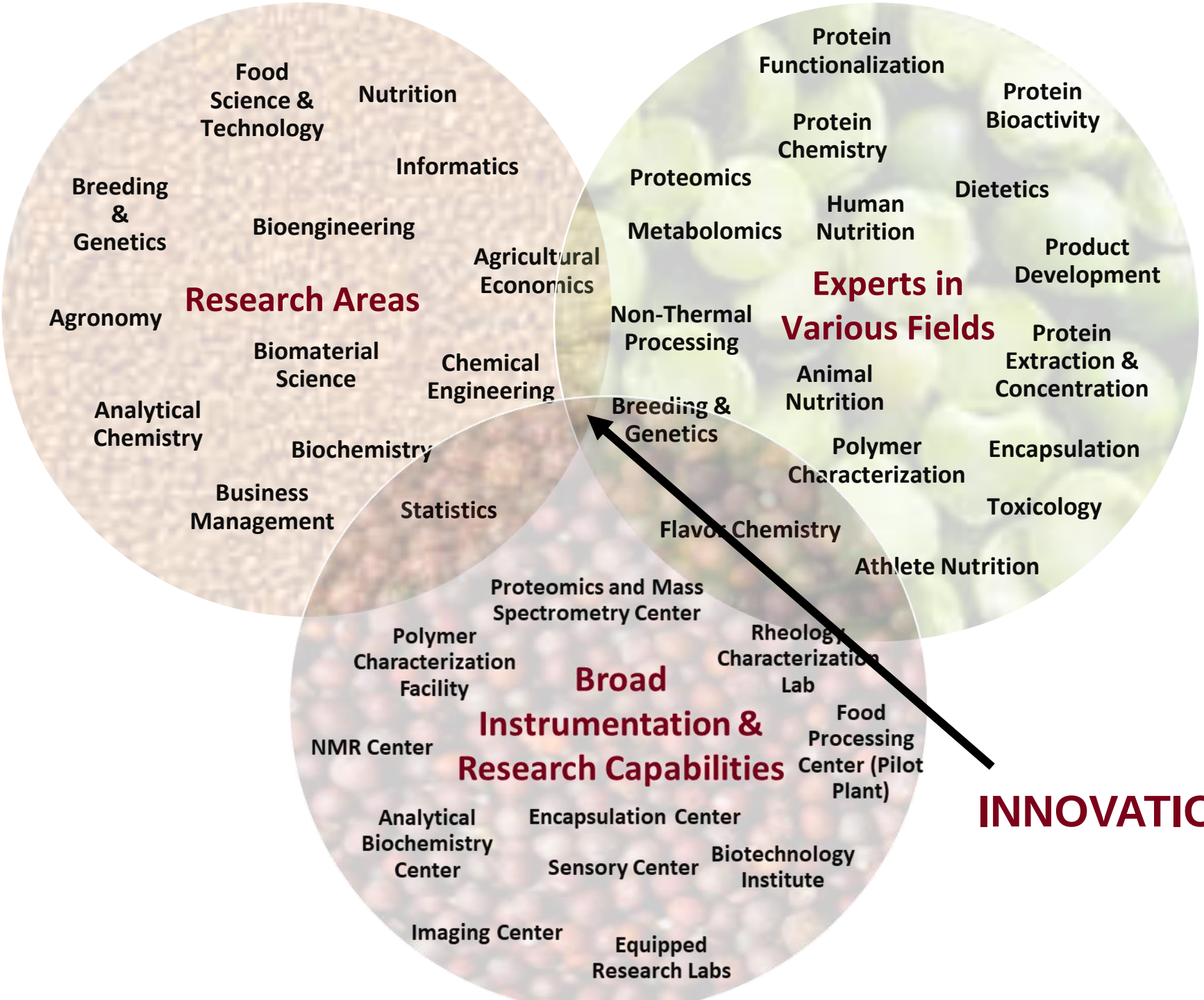
Broad Instrumentation & Research Capabilities
Proteomics and Mass Spectrometry Center
Polymer Characterization Facility
Rheology Characterization Lab
NMR Center
Food Processing Center (Pilot Plant)
Analytical Biochemistry Center
Encapsulation Center
Sensory Center
Biotechnology Institute
Imaging Center
Equipped Research Labs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Encapsulation Center
Sensory Center
Biotechnology Institute
Imaging Center
Equipped Research Labs
INNOVATION

Areas to be Addressed

- **Understand how novel proteins can replace or be combined with traditional protein ingredients in various food products to deliver optimal nutrition, functionality, and flavor**
- **Determine viable (cost effective) extraction (wet and dry) and processing technologies for producing functional protein ingredient from novel sources**
- **Develop prediction models to link protein structure to function**
- **Unveil unique characteristics and applications for each protein source**
- **Investigate crop diversity and breed for protein quality traits**
- **Secure abundant and sustainable supply**

Identified Research Priorities

Production

Primary research focus areas related to breeding, sustainability of the supply, and crop diversity

Processing & Formulation

Primary research focus areas related to extraction methods, unique processing, co-products, food systems, high value end use

Application

Primary research focus areas related to flavor, functionality, and nutrition

https://ppic.cfans.umn.edu/research/research-priorities

Research Advances

- PPIC Funded Research
  - Three successful RFPs resulting in five one-year projects, submitted by PPIC researchers, funded for up to $50,000 per year
  - *Link to research summaries*

- PPIC Grant Proposals (**Over one million dollars**)
  - Proposal funded through Good Food Institute (GFI) (2020)
    - Title: *Characterizing and texturizing proteins from pulses to form fibers with textures that mimic chicken*
    - Three interdisciplinary PPIC researchers
    - Funds granted: **$250,000**
  - Proposal funded through Foundation for Food & Agricultural Research (FFAR) (2020)
    - Plant Protein Enhancement Project
    - Title: *Legumes of the future: Developing methodologies and germplasm to enhance the functionality and nutritional quality of pea protein*
    - Five interdisciplinary researchers
    - Funds requested: **$800,000**

Who?

Industry Members

PPIC Partners

ADM

AFS APPLIED FOOD SCIENCES

Bay State Milling
A Trusted Family of Ingredients.

Bluegrass
Agile Ingredient Innovation™

Cargill™

CONAGRA BRANDS

DANONE
ONE PLANET. ONE HEALTH

FERRERO

General Mills

GREEN BOY GROUP

HERSHEY
THE HERSHEY COMPANY

iff

Ingredion

Kraft Heinz

Microsoft

ROQUETTE
Offering the best of nature™

Saputo

SunOpta™

TATE & LYLE

Who?

Industry Members

Associate Members

AMANO Amano Enzyme

balchem HUMAN NUTRITION & HEALTH

BAYER

BENSON HILL

CALORIS A Better Process

evergrain

Gehl Food & Beverage

THE ish FOOD COMPANY

THE LAND INSTITUTE

MANITOBA hemp foods HARVEST

MEATI FOODS

MINN-DAK GROWERS, LTD. FROM THE HEART OF THE RED RIVER VALLEY Est. 1966

mn DEPARTMENT OF AGRICULTURE

motif FOODWORKS

MYCO TECHNOLOGY

NATURE'S Fynd

NotCo

NUTRIATI Nutrition . Taste . Wellness

NEOM نيوم

PEPSICO

PULSE CANADA

Schreiber

Waters THE SCIENCE OF WHAT'S POSSIBLE.™

Affiliate Members

DryGro

Catapult

Who?

Supporters & Collaborators

Agricultural Utilization Research Institute
auri

BRIDGE2FOOD

Canada
Consulate General
Consulat général

CROWN
EST. 1878

DIL

ExAlt R&D, LLC

Forever Green

gfi / Good Food Institute

hartman GROUP

IMPROVE

PLANT BASED FOODS ASSOCIATION

SCHWAN'S COMPANY
SCHWAN'S CORPORATE GIVING FOUNDATION

Protein Highway
Network for plant-based protein innovation

UNIVERSITY OF MANITOBA

VTT

WAGENINGEN UNIVERSITY & RESEARCH

Who?

- Researchers
  - 30 interdisciplinary researchers across the University of Minnesota and from external institutions!

    https://ppic.cfans.umn.edu/expertise/researchers
- Students and post-docs!

Become a Member of the PPIC!

With investment and collaborative effort between industry and researchers, we can innovate!

- Affiliate
  - Companies with an annual revenue of less than $2 million
  - A yearly membership fee of $3,000

    (Sponsorship available through application)
- Associate
  - Companies with an annual revenue between $2 and 5 million* and for organizations wishing to join the center
  - A yearly membership fee of $6,000/year for 3 years
- Partner
  - A yearly membership of $20,000 for 3 years for companies that have $5-100 million annual revenue;
  - A yearly membership of $40,000 for 3 years for companies with more than $100 million in annual revenue

**A company that makes more than $5 million annual revenue may join at an associate level for a one-year trial period, non-renewable, for $10,000 one-time membership fee. If they wish to remain a member of the PPIC they must join at the partner level the following year and will have to sign a new agreement.*

https://ppic.cfans.umn.edu/members-supporters/membership-options

Benefits to Members

When you join the Plant Protein Innovation Center, you get many benefits:

As an Affiliate member, PPIC offers:

- Visibility on our website and networking opportunities
- Two waived registrations to three annual events (~$2,000 value/per event)
- Opportunity to host booths at fall research spotlight and spring planning meetings at no additional cost
- Expert advice and support for troubleshooting processing/product development challenges
- Facilitated collaboration with other PPIC member companies

As an Associate member, you benefit additionally from:

- A Welcome package of $8,000 value offers a complimentary project custom designed to meet your research needs
- A 20% discount on any subsequent projects to continue reaching research goals
- High-priority project timelines
- Customized hands-on training on various analytical techniques
- Support with setting up new R&D labs for protein research

As a Partner member, you benefit additionally from:

- Having an R&D scientist on the Technical Committee
- Contribution to and development of the center Research Priorities
- Receiving quarterly updates on PPIC Funded projects
- Involvement in decision making to fund research proposals

https://ppic.cfans.umn.edu/model-involvement/membership-options

PPIC Outreach

Annual PPIC events include:

- Industry Focused- Research Planning meeting
- Research Spotlight Meeting
- Protein short courses and hands on experiences
- Workshops on
  - Scale up challenges
  - Abundance of supply challenges
  - Innovative product development and product launches

Outreach will allow for the exchange of knowledge between the public and private sphere

https://ppic.cfans.umn.edu/products-and-benefits/what-ppic-offers-community

What PPIC Offers the Community

- Networking opportunities during events with companies across the value chain (Ingredient suppliers, processors, and CPG companies)
- Interaction with scientists from various disciplines
- Research advancement and innovation
- Development of new and successful protein ingredients and applications
- Post-farm processing technologies that add value along the entire value chain
- Scaling plant protein from regenerative Agriculture
- Development of environmentally sustainable protein crops
- Securing supply chain
- Training the next generation of plant protein scientists

https://ppic.cfans.umn.edu/products-and-benefits/what-ppic-offers-community

Thank You to Our: Technical Committee

Robert Bergia
Protein Nutrition Scientist, Archer Daniels Midland Company

Chris Fields
Chief Science Officer Applied Food Science

Vanessa Brovelli
Sr. Manager, R&D, Bay State Milling

TBD
Bluegrass Ingredients

Nathan Knutson
Nutrition Center of Expertise & PPD Leader for the Americas, Cargill

Don Moss
Principal Development Scientist Conagra Brands

Jonathan Gray
Vice President, R&D Danone North America

Shadia Oshodi
Agtech & Biotech Open Innovation Lead, The Americas Soremartec S.A., Ferrero

Sara Rosene
Associate Principal Scientist, Nutrition & Technology Solutions, Protein Program, General Mills

Vanessa Valdes
Lead Food Scientist/ R&D Lab Manager Green Boy Group

Steven Hess
Senior Director, Snacks Research & Development, The Hershey Company

Der-Chyan Hwang
Global R&D Nourish - Protein Solutions Leader International Flavors & Fragrances

Nagul Naguleswaran
Protein Chemistry Lead, Global Research Ingredion Incorporated

Mahfuzur Rahman
Sr. Scientist, R&D (Next Generation Ingredients)- Technology Platforms The Kraft Heinz Company

Ranveer Chandra
CTO Agri-Food, and Managing Director, Research for Industry

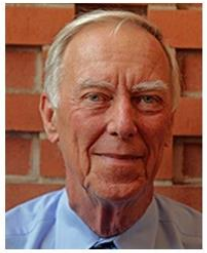
Jennifer Kimmel
Senior Protein Chemist Roquette America, Inc.

Lehan Patrick
Director, R&D Saputo Dairy Foods USA

Heidi O'Sullivan
Principal Scientist, Plant Based Foods & Beverages

Zheng You
Principal Scientist, Health & Wellness R&D Tate & Lyle

Lolly Occhino
Senior Food Scientist, Agricultural Utilization Research Institute



Gary Reineccius
Professor Emeritus, Food Science & Nutrition Department

Thank You to Our: Executive Board

Laurice Pouvreau
Expertise Leader Protein Technology
Wageningen University & Research (The Netherlands)

Denis Chéreau
CEO,
IMPROVE (France)

Greg Cuomo
Associate Dean for Research & Graduate Programs,
CFANS, University of Minnesota

Sergiy Smetana
Head of Food Data Group,
German Institute of Food Technologies (DIL e.V.)
(Germany)

Julie Simonson
Food & Beverage R&D Executive Professional,
Schwan's Company

Jason Robinson
Director – Business Development, Food, Agricultural Utilization Research Institute

Christina Connelly
Trade Commissioner,
Consulate General of Canada

The PPIC will not only bring economic gain to the industry, but will also address the consumer desire for nutritious and healthy food, have a positive impact on the environment by seeking and utilizing sustainable crops, provide additional sources of protein for the growing population, and provide revenue to farmers

Partner with us today to change the landscape of plant-based protein tomorrow!

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